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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
HOYE, MICHAEL W	

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 09/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/800,397	SHARMA, ALOK	
	Examiner	Art Unit	
	Michael W. Hoye	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-10,12-17 and 22-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-10,12-17 and 22-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1, 3-10, 12-17 and 22-40 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3-4, 8, 16-17, 22-26 and 36-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barham et al (USPN 6,721,371 B1), in view of Patel et al (US 2004/0213358 A1).

As to claim 1, note the Barham et al reference which discloses a method of demodulating multiple channels. In Figure 18, Barham et al discloses a high speed demodulator system. The claimed providing a first analog to digital converter having an analog input and a digital output is met by analog to digital converter (ADC) 102 (Fig. 18), which has an analog input and a digital output. The claimed providing a first plurality of digital demodulators is met by a bank of parallel programmable demodulators 10 connected to an output of the high speed demultiplexer (also see col. 3, line 43 – col. 4, line 57). The claimed each demodulator having a programmable center frequency is met by col. 6, lines 56-63, where the bank of demodulators 10 are

programmable and may be programmed to have different center frequencies. The claimed coupling a band of frequencies to the analog input of the first converter, the band including a first plurality of channels is met by col. 4, lines 34-44, where Barham et al discloses that the demodulator system of parallel programmable demodulators 10 may be used in an advanced data communications system that includes CDMA systems, TDMA systems, etc. Accordingly, the high speed demodulator system in Fig. 18 receives a band of frequencies at the RF front end 101, wherein the band of frequencies includes a first plurality of channels as appreciated by one of ordinary skill in the art. The claimed creating digitized samples of the band at the output of the first converter is met by the ADC 102, which outputs digitized samples. The claimed coupling the digitized samples to the plurality of demodulators is met by the digitized samples are coupled to the demodulators 10 through the high speed demultiplexer (DEMUX) 103. The claimed demodulating a second plurality of channels from the band of frequencies is met by demodulators 10 demodulate pluralities of channels from the band of frequencies. Barham et al discloses adaptive weights (col. 4, lines col. 6, lines 37-55). Barham et al does not explicitly disclose the claimed maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of multiple low-pass digital filters, each filter having one of a predetermined set of bandwidths; selecting a first center frequency and first bandpass bandwidth for provisioning a first one of the first plurality of demodulators; retrieving the filter coefficients associated with the first bandpass bandwidth; subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and loading the transformed coefficients into coefficient latches in the first demodulator. However, the Patel et al reference specifically teaches a method of using pre-stored or pre-computed sets of filter coefficients in

non-volatile storage or ROM (see ¶'s [0050]-[0051] and [0055]) in order to reduce processing time and latency in digital filtering. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the Barham et al reference with the additional teachings of the Patel et al reference for the advantage of having pre-computed sets of filter coefficients in non-volatile storage in order to reduce the amount of processing and delays which may occur when using digital filters.

As to claim 3, the claimed operating the first demodulator at the first center frequency; subsequent to said operating, loading the coefficient latches in the first demodulator with transformed coefficients corresponding to a second center frequency; and operating the first demodulator at the second center frequency is met by the combination of the Barham et al and Patel et al references as described above in claim 1, where Barham et al explicitly teaches that each of the programmable demodulators has a reconfigurable FIR filter 14 (see col. 3, line 43 – col. 6, line 67).

As to claim 4, the claimed selecting a second center frequency and second bandpass bandwidth for provisioning a second one of the first plurality of demodulators, wherein said first and second bandpass bandwidths are unequal; retrieving the filter coefficients associated with the second bandwidth; subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the second center frequency; and loading the transformed coefficients into coefficient latches in the second demodulator is met by the combination of the Barham et al and Patel et al references as described above in claims 1 and 3, where Barham et al explicitly teaches that each of the programmable demodulators has a reconfigurable FIR filter 14 and different

center frequencies and bandpass bandwidths may be used for each demodulator in the array of programmable demodulators with reconfigurable FIR filters (see col. 3, line 43 – col. 6, line 67).

As to claim 8, the claimed first converter, the demodulators, and the non-volatile storage are implemented on a single integrated circuit is met by the bank or array of IC demodulators 10 in Barham et al (col. 3, line 53) as previously combined above with Patel et al.

As to claim 16, the claimed wherein each of the demodulators uses a FIR digital filter is met by the abstract of Barham et al, which discloses that, "A parallel programmable demodulator includes a reconfigurable FIR filter", and by col. 3, lines 51-55, which describes a bank or array or demodulators 10, and furthermore, where each of the demodulators includes a reconfigurable FIR filter 14 (see col. 5, lines 49-52).

As to claim 17, the claimed wherein each FIR filter is an Optimum Equiripple Linear-Phase filter is a matter of design choice as known to those of ordinary skill in the art of filter design.

As to claims 22-23, the claimed number of the filter coefficients for each filter is at least 16 (claim 22) and is at most 24 (claim 23) is also a matter of design choice, which is well known to those of ordinary skill in the art of filter design, in addition to, as is well known in the art, tradeoffs must be made between passband ripple (less is better), stopband attenuation (more is better), for a fixed number of coefficients. Therefore, the number of coefficients selected by the inventor or designer is relative to the type of tradeoff benefits the designer would like to gain or lose as described above.

As to claims 24-26 and 36-40, the claims are met by the rejection of claims 1, 3-4, 8, 16-17 and 22-23, as described above.

4. Claims 5-7, 13, 27-29 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barham et al (USPN 6,721,371 B1), in view of Patel et al (US 2004/0213358 A1), in further view of Quigley et al (USPN 6,650,624 B1).

As to claim 5, the claimed first converter and the demodulators are located within the upstream section of a CMTS channel bank organized into upstream and downstream channels is not explicitly disclosed by the Barham et al and Patel et al references. However, Quigley et al discloses in Fig. 26 and in col. 37, lines 29-45, a cable modem termination system (CMTS) including a plurality of demodulators 700a-700n, which receive modulated data input from a plurality of cable modems via a common transmission medium. The demodulators 700a-700n provide a demodulated data output for the frequency division multiplexed (FDM) upstream channels via which data is transmitted from the plurality of cable modems to the CMTS. The Quigley et al reference further teaches or discloses that the cable modems communicate with the CMTS via time division multiple access (TDMA). Although the Quigley et al reference does not explicitly disclose an ADC within the CMTS, the Barham el al reference as described above in claim 1, discloses a high speed demodulator system that may be used in an advanced data communication system that includes TDMA systems. Therefore, regarding the teachings of Barham et al as combined with Patel et al above, it would have been further obvious for one of ordinary skill in the art at the time of the invention to have modified the high speed demodulator system of Barham et al in view of Patel et al to further include implementing the system into the CMTS as taught by Quigley et al for the advantage of having a CMTS channel bank organized into upstream and downstream channels. Also see the Applicant's admitted prior art in Fig. 17A.

As to claim 6, the claimed ratio of the number of upstream channels demodulated by the CMTS channel bank to a number of upstream input connectors of the CMTS channel bank is M is met by a matter of design choice as appreciated by one of ordinary skill in the art in the design of CMTS architecture.

As to claim 7, the claimed method of claim 6, wherein M is 16 is rejected on the same grounds as claim 6, since the claim has similar scope as claim 6.

As to claim 13, the claimed CMTS is DOCSIS compatible is rejected based on the fact that it is well known in the art of cable modem technology that a CMTS is DOCSIS compatible.

As to claims 27-29 and 33, the claims are met by the rejection of claims 5-7 and 13, as described above.

5. Claims 14-15 and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barham et al (USPN 6,721,371 B1), in view of Patel et al (US 2004/0213358 A1), in further view of Quigley et al (USPN 6,650,624 B1), and in further view of Peyrovian (USPN 5,768,682).

As to claim 14, the claimed upstream channels are in the 750-1000 MHz portion of the spectrum is met by a matter of design choice, which is well known to those of ordinary skill in the art of transmitting data over cable service. Although, the claimed upstream channels are in the 750-1000 MHz portion of the spectrum is not explicitly disclosed by the Barham et al, Patel et al, or the Quigley et al references, the Peyrovian reference specifically teaches in col. 3, lines 38-53, that at least a portion of the upstream information may be modulated in a high frequency band (750-1000 MHz). Furthermore, Peyrovian teaches in col. 3, lines 44-53 that, "there are

several advantages to modulating at least a portion of the upstream information via a carrier to such a high frequency band. First, the high frequency band (750-1000 MHz) lying above the downstream information band (e.g., 50-750 MHz) is typically much less susceptible to noise than the low frequency band (5-40 MHz) that has traditionally been employed to carry the upstream information. Further, the frequency band of 750-1000 MHz has a much greater bandwidth than the low frequency band of 5-40 MHz." Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have further combined the Barham et al, Patel et al, and Quigley et al references with the Peyrovian reference which specifically discloses modulating the upstream channels in the 750-1000 MHz portion of the spectrum for the advantages given above.

As to claim 15, regarding the claimed at least one frequency stacker is used to densely pack each sub-band of the 750-1000 MHz spectrum portion. The Examiner takes Official Notice that it is notoriously well known in the art of data transmission over cable service to densely pack each sub-band of a given radio frequency (RF) spectrum portion (i.e. 750-1000 MHz) using at least one frequency stacker, for the advantage of efficiently using each sub-band in the given frequency spectrum so that the maximum amount of sub-bands in the spectrum may be used for sending data over the cable line. Therefore, it is submitted that it would have been clearly obvious to one of ordinary skill in the art at the time of the invention to have used at least one frequency stacker to densely pack each sub-band of the 750-1000 MHz spectrum portion for the advantage given above.

As to claims 34-35, the claims are met by the rejection of claims 14-15, as described above.

6. Claims 9-10, 12 and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barham et al (USPN 6,721,371 B1), in view of Patel et al (US 2004/0213358 A1), in further view of Quigley et al (USPN 6,650,624 B1), and in further view of the Applicant's admitted prior art in Fig. 17(A).

As to claim 9, the claimed CMTS channel bank is organized using a plurality of modules, each module having a plurality of downstream channels and a plurality of upstream channels is met by the admitted prior art Fig. 17(A), that discloses a CMTS channel bank with a module of 4 downstream connectors for channels and 16 upstream connectors for channels and there are 8 modules in the bank, which directly corresponds to the claimed features. The claimed features are not patentable in view of the disclosure of the admitted prior art.

As to claim 10, the claimed number of the upstream channels is 4 times a number of the downstream channels is met by admitted prior art Fig. 17(A), that discloses a CMTS channel bank with a module of 16 upstream connectors for channels and 4 downstream connectors for channels and there are 8 modules in the bank, which directly corresponds to the claimed features. The claimed features are not patentable in view of the disclosure of the admitted prior art.

As to claim 12, the claimed CMTS channel bank has 4 times as many upstream channels as downstream channels is met by admitted prior art Fig. 17(A), that discloses a 32 downstream by 128 upstream CMTS channel bank, which directly corresponds to the claimed feature. The claimed feature is not patentable in view of the disclosure of the admitted prior art.

As to claims 30-32, the claims are met by the rejection of claims 9-10 and 12, as described above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael W. Hoye whose telephone number is **571-272-7346**. The examiner can normally be reached on Monday to Friday from 8:30 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Miller, can be reached at **571-272-7353**.

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Michael W. Hoye
September 15, 2006

JOHN MILLER
SUPERVISORY PATENT EXAMINER
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